A Bird Count on the Arabian 'Jol'

BY

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(*With two plates*)

INTRODUCTION

Quantitative estimates or counts of bird species anywhere in the tropics are sadly lacking. The numbers of species that occur in any area, with some comments on their general abundance (e.g. fairly common, rare, abundant, everywhere, etc.) are usually available. But actual quantitative records of the numbers of individuals of any species present have scarcely ever been made. This makes it extremely difficult to guage the proportion of the avian population dependent upon various available food supplies, such as seeds, fruit, or insects. In other words, to relate the avifauna to its environment.

Bird populations have seldom been counted adequately in temperate regions, much less in the tropics, and still less in such extreme environments as desert. When an opportunity occurred, in October 1965, to make a broad transect count in a large area of the Arabian 'Jol' or desert, between the Wadi Hadhramaut and the Rub al Khali (or Empty Quarter), I therefore seized the chance. The results cannot be claimed as anything more than a broad indication of the relative abundance of the species in this area at this particular time, but are probably better than a mere guess based upon relative abundance of species as reported by collectors, or as indicated by the number of skins available in museums.

The count took place between 7/x and 12/x/65, along a route from Armaa—Sanau—Wadi Rakhot—Tarfait—Armaa—Fort Thamud—to the head of Wadi Ardha (one of the tributary *wadis* of the Wadi Hadhramaut). The distance covered was 413 miles as recorded on the milometer. In this distance a total of 676 birds of at least 20 species were seen in a transect estimated to total about 6820 acres, or 10·6 sq. miles. This results in an overall density, actually probably higher, of one bird per about ten acres in all types of habitat. This very approximate figure is qualified by the observations which follow.

METHODS

The count was made from an open-sided Landrover travelling along rough desert tracks, usually at 5-15 m.p.h. but sometimes up to 25 m.p.h.

for short distances. As birds were flushed by the passage of the vehicle they were identified and recorded in a field notebook ; the records were summarised and recorded more clearly at the end of each journey, usually twice a day.

For the purpose of the count I estimated that a strip of land 20 yards wide on either side of the track was being covered. Most birds within this distance were either flushed into flight, or ran and showed themselves, particularly in bare terrain. Beyond this distance they frequently squatted without flying, and in thick vegetation could not be seen. One mile of track was in this way estimated to represent a transect of about 16·5 acres area.

The terrain was divided into three types of habitat called, for convenience, Stony Jol, Earth Jol, and Wadi Beds. Generally the track traversed one or other of these habitats for several consecutive miles but sometimes, particularly in Wadi Beds, it would follow the boundary between one type and another. In such cases arbitrary decisions had to be made as to the habitat to which a particular bird belonged. In practice this was not difficult, for observations on foot and at camping sites showed that birds of the Stony and Earth Jol were also to be found in Wadi Beds, though not usually vice-versa.

Identification of species was made at the time when possible, and by later reference to Meinertzhagen's BIRDS OF ARABIA (1954). It was not possible to identify all the birds seen at once, but the total number of species was small and several, such as the Bifasciated Lark *Certhilauda alaudipes*, Blackstart *Cercomela melanura*, Houbara *Chlamydotis undulata* and Seesee Partridge *Ammoperdix heyi* were instantly recognisable. No attempt was made to separate several similar species of larks seen in the open and grouped together as ' Larks, various ' as this could not always be done from a moving vehicle ; 66% were probably *Ammomanes deserti*. The unidentified species were mostly small skulking warblers noted in the bushes in the Wadi Beds, and not identifiable at all from a moving vehicle.

The species have been listed in the order of Meinertzhagen's, BIRDS OF ARABIA. While not agreeing with much of the author's systematic approach it seems preferable to adhere to the order given in the only available standard work on Arabian birds than to make confusion worse confounded by utilising e.g. the order of the Peter's List (in process of revision) or Sclater's SYSTEMA AVIA AETHIOPICARUM, which properly deals with areas outside the limits covered by this survey.

ECOLOGY OF THE AREA

As stated, the area was divided into 3 main habitats :

(i) **Stony Jol.** Forbidding country composed of vast expanses of limestone chips, gravel, or larger plate-like stones, and practically devoid

of vegetation. Generally dark brown in colour and, to superficial examination, markedly hotter than the other two types.

(ii) **Earth Jol.** Open treeless desert, but composed of earth or soil rather than stones. Yellowish-brown in colour, with somewhat lower surface temperatures, but still very hot in the middle of the day. Vegetation, while still very sparse, was more abundant than on Stony Jol, and included small patches of dried annual grasses and a few lowly succulents.

(iii) **Wadi Beds.** The bottoms of depressions, or actual watercourses, small or large. In such areas quite a good cover of shrubs and perennial grasses was usual. Shrubby *Acacia* bushes, of species close to *A. mellifera*, *A. nubica* and *A. reficiens* were commonest, but with some *Salvadora persica* and occasional larger trees, including *Boscia* sp. The grass was often knee-deep, but grey and dry. This type of terrain provides the only shade available, other than in the shelter of a rock, and while no measurements were possible the temperature of the soil in such shade was certainly much lower than in the two preceding habitats.

The vegetation in the Wadi Beds was surprisingly luxuriant considering that the whole region has annual rainfall of the order of 2-3 inches (50-75 mm.) and that rain sometimes does not fall at all in particular years. This is probably the result of differential absorbtion of the available rainfall. In the occasional torrential storms heavy enough to result in runoff the Stony Jol loses most of the water that falls on it, so that its effective annual rainfall may be no more than half the average annual total. Percolation and absorbtion would be better on the Earth Jol, but under heavy rain this becomes impacted and runoff occurs. The runoff from both these upland areas collects in the Wadi Beds, where it either rushes along as a torrent or, in flat areas, lies there as a shallow sheet of water till it sinks in or evaporates. The effective rainfall per unit area of Wadi Bed may be 5-6 times the annual average for the whole region, perhaps as much as 10-15″ (250-375 mm.). It is this that permits the development of relatively luxuriant vegetation in the Wadi Beds.

No quantitative estimate of the proportion of the country covered by each of these types of habitat was possible. The transect passed through 119 miles (29%) of Stony Jol, 205 miles (50%) of Earth Jol, and 89 miles (21%) of Wadi Beds. However, the road tended to follow Earth Jol where it could, or wound up Wadi Beds between forbidding stony hills—the best and most practicable route. In practice it was likely that Wadi Beds formed no more than 10-15% of the total area, the remainder being divided between Earth Jol and Stony Jol in perhaps the proportions 35% and 50-55% respectively. Stony Jol was certainly the most widespread habitat.

Bird count results

Details of the actual counts are given below, with mileages and the time of day (Table 1).

Table 1

	Date	Route	Time	Mileage	No of Birds	Notes
1.	7/x	Armaa-Sanau	14·00-18·30	57	179	Incl. large flock of Sandgrouse.
2.	8/x	Sanau—Camp in desert	11·30-13·00 and 14·30-17·00	75	89	
3.	9/x	Camp—Wadi Rakhot	08·00-08·30	4	20	
4.	10/x	Wadi Rakhot-Camp Camp—Tarfait	15·30-17·30 07·00-10·00	80	94	
5.	10/x	Tarfait-Armaa	14·00-17·00	56	125	
6.	11/x	Armaa-Thamud	16·00-18·00	46	78	Completed after dark.
7.	12/x	Thamud-Wadi Ardha	14·00-18·30	95	91	
				413	676	

Overall average of birds per mile of transect (16·5 acres)=1·63, or about 1 per 10 acres.

The several counts can be analysed further from several points of view, as follows :

(i) *Effect of Time of Day.* The time of day had an effect on the numbers of birds seen. In this area, at this time of year, first light was about 04·45 hrs. and birds were stirring immediately afterwards. An Egyptian Vulture was seen to leave its roost near Sanau by 05·00 hrs. on 8/x and Chestnut-bellied Sandgrouse *Pterocles exustus* were flighting to water by 05.40 hrs. The ' early morning ' occupied until about 07·00 hrs. after which the heat of the sun was noticeable, though not strong until *c.* 09·00 hrs. Thus, between 05·00 and 09·00 hrs. was a time of maximum activity for birds, reduced thereafter as the day's heat increased.

The hottest hours were between 11·00 and 15·00, with a slight but noticeable cooling after 14·00 hrs. We tried to move least during this hot period but sometimes were forced to. After 15·00 hrs. activity among birds increased, but was never as great as in the cool early morning. Some birds, however, particularly flocks of larks, were then to be seen making for roosting sites.

Although dusk did not come before 18·30 hrs., and it was not properly dark until later, few birds were on the move after 18·00 hrs., when daylight was still strong. There was, in fact, much more intense bird activity in the first hour of daylight (05·00-06·00) than in the last (17·30-18·30), and in the first four hours of daylight than in the last four.

Counts 1, 3, 4, and 6, totalling 187 miles were considered as having been done at favourable times of day, when birds were on the move, and counts 2, 5, and 7, totalling 226 miles, at less favourable or unfavourable times. The first group of counts averaged 2·0 birds / mile overall, or about one per eight acres. The second averaged 1·3 birds / mile overall, or about 1/13 acres. It is likely that only the counts done at favourable times of day, when most birds in the 40 yard wide transect moved or were flushed, gave a good approximation of the numbers. One bird per eight acres overall is accordingly a better estimate than one bird per ten acres overall, or one per thirteen acres.

Individual habitats at favourable times gave still higher figures. On 9/x in four miles of Wadi Bed between 08·00 and 08·30 hrs. (probably just past the peak of morning activity) 20 birds, or five per mile, or one per 3·5 acres were seen. This particular stretch of Wadi Bed was, moreover, not abnormally rich in birds, so that such areas probably support an average at least a bird per four acres.

I made several attempts to check the accuracy of the transect counts by trying to count small areas near our camps on foot. However, I found the birds so shy and elusive that I obtained negative results. Evidently, counts from a car, inaccurate though they may be, are more reliable than those done on foot, when larks and partridges scuttled away unseen among the vegetation and birds that took flight more readily usually flitted from bush to bush before they could be identified.

(ii) *Effect of Habitat.* As might be expected, the denser the vegetation the more the birds, both in number of species and individuals. Results according to habitat are set out in Table 2.

From this it can be seen that the average overall density for Stony Jol was almost exactly one bird per mile, or one per 16·5 acres. For Earth Jol the overall density was 1·48 per mile or one to 11 acres, and for Wadi Beds three per mile or one per 5·5 acres.

The figures for Stony Jol are probably about right. On several occasions birds seen included Ravens, *Corvus corax ruficollis* or Egyptian Vultures which perched or loafed there although actually attracted to camp sites. We avoided travelling through Stony Jol in the heat of the day so that the counts are less biased by the effect of time of day. In Earth Jol and Wadi Beds we did more travelling in the hot hours, and the overall density figures should be somewhat higher. Perhaps densities of 1/15 acres, 1/8 acres, and 1/4 acres would be near the truth for the three habitats.

Figures for overall density in these habitats in a single isolated count may mean little, and would evidently have to be supported by other figures over a period of time for any true picture to emerge. However, the figures for relative numbers of particular species are probably more closely indicative of the relative abundance and habitat preferences of

certain species. Since over 50% of the species are apparently resident the sample may give quite a good idea of the relative numbers.

TABLE 2

NUMBERS OF INDIVIDUAL SPECIES SEEN IN DIFFERENT HABITATS

Species	Status	Stony Jol 119 miles	Earth Jol 205 miles	Wadi beds 89 miles	Total 413 miles
Corvus corax ruficollis	R	13	3	2	18
Certhilauda alaudipes	R	—	21	—	21
Eremopterix nigriceps	R	—	15	—	15
All other larks (3+spp.) including	R and M	81	95	54	230
Ammomanes deserti (66%)	R	54	63	36	153
Lanius excubitor	R	—	1	8	9
Pycnonotus capensis	R	—	—	3	3
Turdoides squamiceps	R	—	—	20	20
Oenanthe deserti	M	8	14	4	26
Oenanthe leucomela	M	—	2	5	7
Cercomela melanura	R	5	—	20	25
Hirundo domestica	M	—	2	—	2
Merops superciliosus	M	—	—	6	6
Falco tinnunculus	M	1	—	—	1
Buteo rufinus	M	1	—	—	1
Neophron percnopterus	M	2	11	3	16
Pterocles exustus	R	—	118+	30	148+
Chlamydotis undulata	R	—	—	1	1
Ammoperdix heyi	R	1	2	68	71
Unidentified (mainly small warblers, 4-5 species).	R and M	2	16	38	56
Total		114	300	262	676
Number of sp. minimum		12	14	16	20
probable		13	16	10	25
Species not seen in other habitats		2	3	4	

Notes (1) Of two species found only in Stony Jol (Kestrel and Buzzard) both were probably fortuitous ; of three found in Earth Jol one (Swallow) was fortuitous ; but all four species found only in Wadi Beds are confined to that habitat.

(2) The number of species of unidentified small warblers was greater in the thick cover of Wadi Beds than in Stony Jol, where few were seen.

(3) Under Status, R=Resident, M=Migrant.

Some species appeared very clearly confined to or concentrated in certain habitats. The Bifasciated Lark, for instance, was never seen away from Earth Jol, and actually the population was entirely concentrated in a relatively small part of the area traversed, between Armaa-Sanau and Armaa-Thamud. In this area, which was also heavily populated by large *Uromastix* lizards (vern. *Dhabb*) detailed ecological and pedological investigation would doubtless have revealed some con-

sistent feature accounting for this restricted distribution. The Finch-Lark also appeared to prefer Earth Jol, but may not have been confined to it, as some were probably included among the larks, various, which would not apply to the instantly identifiable Bifasciated Lark. The Blackstart and Seesee Partridge, although not absolutely confined to the denser vegetation of Wadi Beds, were as characteristic of that habitat as the babbler *Turdoides squamiceps* or the bulbul *Pycnonotus barbatus*, both species seen nowhere else.

In contrast to these species were several, for instance the Egyptian Vulture, Long-legged Buzzard, and Kestrel which could have been encountered anywhere, though the last two are perhaps more likely to be seen in rocky mountainous areas. Equally the fact that Swallows were only seen in Earth Jol is entirely fortuitous ; they would have been more likely in Wadi Beds. Ravens might also have turned up anywhere, but in practice showed a definite preference for rocky terrain.

In relative numbers larks are by far the commonest birds in the area. The total for all larks is 266/676, or 39·5% of all recorded birds. Apart from the easily identifiable Bifasciated and Finch Larks probably about 66% of Larks, various, were the Desert Lark, *Ammomanes deserti*, which, with a total population of about 153 in the sample was the commonest and most widespread bird in the area, living in all habitats, and the only species at all common on Stony Jol. Other larks included with it in Larks, various, probably included the Crested Lark *Galerida cristata* and other species of *Ammomanes* with, for instance, Finch Larks when seen against the light, when they could not be so certainly identified. With greater experience it became possible to distinguish the individual species more clearly, but as it had been found impracticable to do so in the first one or two days the several rather similar-looking species of larks were lumped together to the end.

The second commonest species was the Chestnutbellied Sandgrouse, but this may have been fortuitous, as we camped near a well-known watering place at Sanau, and observed the flight next morning. If that flight had been included in the count the sandgrouse would have outnumbered by far all other species together. Perhaps 3000-4000 collected near the spring, but they may have come from an area as great as 5000 square miles. Their real density may have been lower, about 100 : 200 acres, than is indicated by the count which gives them an overall density of one per 2·8 miles of transect, or 45 acres. But the numbers coming to the spring and the distance they may have come from could not be accurately computed.

Other than larks and sandgrouse the commonest species, rather surprisingly, was the Seesee Partridge. It was confined to well-vegetated areas. Other characteristic birds seen every day included the Desert Wheatear, seen in most types of habitats, the Blackstart and the Babbler,

seen mainly or entirely in Wadi Beds. It was something of a surprise to find such species as the Great Grey Shrike *Lanius excubitor* relatively rare in total numbers as, being conspicuous, they were more noticeable than several commoner species.

Probably the six commonest and most widespread birds of the area are the Desert Lark, perhaps another species of Lark, the Chestnut-bellied Sandgrouse, Seesee Partridge, Desert Wheatear, and Blackstart, in approximately that order of abundance.

Notes on Individual Species

The list of species given in Table 2 contains some surprising gaps. For instance, no species of dove was seen, nor any courser. There were apparently no resident raptors at all, either diurnal or nocturnal, and very few migrants (1 Kestrel and 1 Buzzard), other than the scavenging Egyptian Vulture, which is largely dependent on man. No harrier of any species was seen in what should have been the height of their southward migration.

The absence of diurnal resident raptors was peculiar in that populations of such species as Seesee Partridges and Chestnutbellied Sandgrouse, with large and small lizards (*Uromastix* and other species) appeared more than adequate in some areas to support occasional pairs of, for instance Lanner Falcons *Falco biarmicus* or Chanting Goshawks *Melierax metabates*, both of which would occur in a country with similar vegetation in northern Kenya. The total absence of nocturnal raptors was perhaps stranger still. No owl of any species was either seen or heard at any of several desert camps, and only one nightjar, probably a migrant *Caprimulgus europaeus* was seen near an oil company camp, catching insects by the electric lights. According to my companion, Mr. G. H. H. Brown, an experienced field naturalist who has spent many years in the deserts of northern Kenya, this absence of diurnal and nocturnal raptors was normal. In several months, residence in this area he had seen only odd large falcons, probably Sakers *Falco cherrug*, and had once heard a Scops Owl *Otus scops*.

The one trace we found of a resident raptor was a breeding site found on 10 October between Wadi Rakhot and Tarfait, in a pass among stony hills. There were two large nests, both on top of *Boscia* trees, broad flat structures resembling those of the Lappetfaced Vulture *Torgos tracheliotus* or the Whiteheaded Vulture *Trigonoceps occipitalis*, neither of which has been recorded breeding in Arabia, though the Lappetfaced Vulture has bred in the Rift Valley near the Dead Sea. They might also have been nests of the Tawny Eagle *Aquila rapax*. There was evidence that the nests had been occupied recently, one in 1965, but there were no feathers to assist identification. All I could find was a few pieces of bone, not

identifiable later, but probably picked up as carrion. It is unlikely that any naturalist will pass that way for some time, but the identity of the two nests could be checked in spring during the breeding season ; neither is more than 300 yards from the road, which passes just beside one of them.

Apart from these general observations the following are notes on species of particular interest :

Corvus corax ruficollis Brown-necked Raven.

A scavenger about human encampments, sometimes met with in open desert. Showed a definite preference for perching on black or dark rocky outcrops, avoiding the pale coloured Earth Jol. Probably the most widespread resident scavenging species.

Certhilauda alaudipes Bifasciated Lark.

A characteristic rather than an abundant species of certain types of Earth Jol. All those seen were noted in about 110 miles of the total of 205 miles of this type of country traversed. They appeared to avoid the more extreme forms of desert and to prefer areas with at least access to perennial grass and shrubs in the depressions and Wadi Beds, though they themselves were never seen except on areas of bare earth. They occurred singly or in pairs, never in flocks.

Ammomanes deserti Desert Lark.

The commonest and most widespread species in all habitats, and the only species at all common in the more extreme environments of the Stony Jol. Since they were inconspicuous ground-loving birds (unlike *C. alaudipes*) a good many were probably missed. Usually they occurred in pairs, sometimes singly, and towards evening sometimes in small flocks, apparently making for cover to roost.

Eremopterix nigriceps Finch-Lark.

Seen only a few times, in small flocks, so that it appears from figures to be more widespread than it actually is. A proportion of the unidentified larks, seen in poor light, were probably this species. It showed a definite preference for Earth Jol, but probably also occurred on Stony Jol.

Oenanthe deserti and **Oenanthe leucomela** Desert Wheatear and Pleschanka's Chat (or Pied Wheatear).

These two species of wheatears showed clear preferences for different habitats. The pale-coloured Desert Wheatear preferred open habitats of Stony or Earth Jol, occasionally perching in Wadi Beds, while the Pied Wheatear preferred denser vegetation with excursions into the Earth Jol, never in Stony Jol.

Cercomela melanura Blackstart.

Common in Wadi Beds, and sometimes seen out in the open in Stony Jol where such areas adjoined Wadi Beds. It appeared to avoid Earth Jol, perhaps because, as a dark-coloured bird, it would have been relatively conspicuous against a pale-coloured background. However, in the absence of any relentless diurnal avian predator it is a little difficult to see how such preference could be of any practical value ; perhaps it is during seasons of migration when more raptors may be present.

Buteo rufinus Longlegged Buzzard.

One individual, of the dark phase, was seen late one evening, in Stony Jol. It was shy and difficult to approach, but with x 12 binoculars the field characters were clear.

Neophron percnopterus Egyptian Vulture.

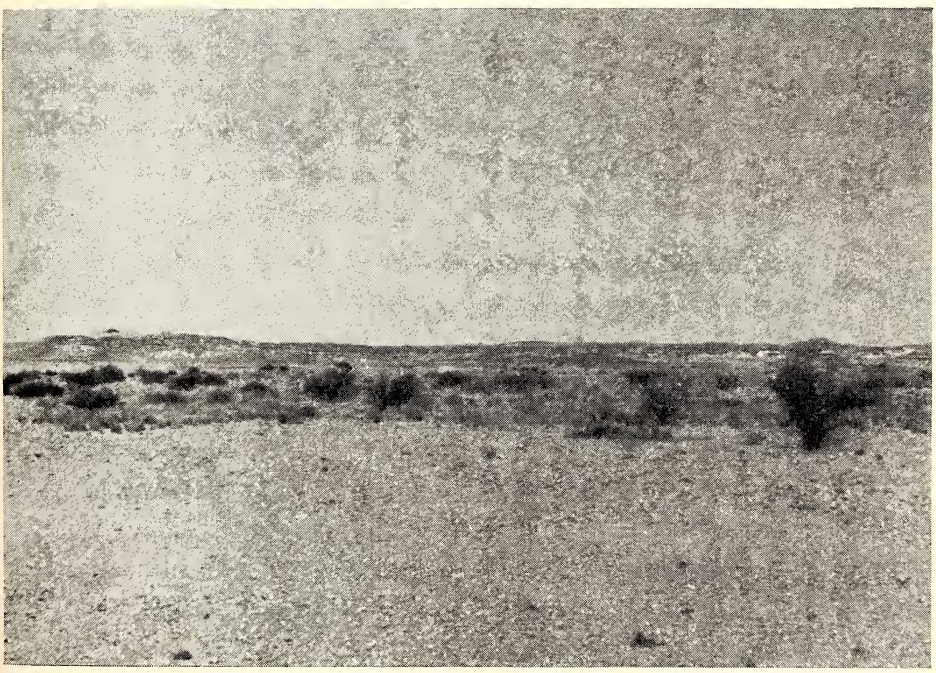
Seen migrating across our track in flocks, and also around dwellings and camps. No evidence of breeding was seen, so that probably all individuals present were migrants.

Pterocles exustus Small Pintailed or Chestnutbellied Sandgrouse.

At a spring near Sanau the sandgrouse flight was observed from before first light to about 09·00 hrs. There was no evidence that any sandgrouse got on the wing before dawn, and the first approaching parties, coming from close by, were seen at 05·40 hrs. about 1 hour after first light. Small parties kept coming upto 06·30, after which the flight intensified, with parties both larger and more frequent. The main flight came in at 07·00-07·30 hrs. I attempted to count the incoming birds at first, but the impossibility of watching all round the compass, and the numbers, defeated me. All first collected at a gathering ground about half a mile from the spring, on some stony ridges, where they had a good view all round. By 08·00 hrs. flighting had stopped but the birds had made no attempt to drink. There may have been 3000-4000 present by then, and assuming that all had started to flight soon after first light (as the parties coming from close by did) they may have come from anywhere within a range of 40-50 miles, perhaps more. They may therefore have collected at the spring from a total of some 5000 square miles of country. We left before they had gone to water, but perhaps they would have remained on the gathering ground as long as any human beings were obvious in the area.

Chlamydotis undulata MacQueen's Bustard, or Houbara.

Only one was seen, but this was said to be unusual. This species is hunted by the local tribesmen with rifles.



Above : Stony Jol, in the headwaters of a tributary of the Wadi Hadhramaut ; almost bare of vegetation. Haunt of *Ammomanes deserti*. *Below :* Earth Jol with surface of small gravel in foreground ; Wadi bed vegetation in a depression behind ; haunt of *Certhilauda alaudipes*.

(*Photos : Author*)